RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole # 41-08-02

Log Event A

Borehole Information

Farm : SX **Tank :** SX-108 **Site Number :** 299-W23-102
N-Coord : 35,390 **W-Coord :** 75,744 **TOC Elevation :** 662.41
Water Level, ft : **Date Drilled :** 3/16/1962

Casing Record

Type : Steel-welded **Thickness :** 0.313 **ID, in. :** 8
Top Depth, ft. : 0 **Bottom Depth, ft. :** 75

Equipment Information

Logging System : 1 **Detector Type :** HPGe **Detector Efficiency:** 35.0 %
Calibration Date : 03/1995 **Calibration Reference :** GJPO-HAN-1

Logging Information

Log Run Number :	1	**Log Run Date :**	6/5/1995	**Logging Engineer:**	Mike Widdop
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	47.5	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a
Log Run Number :	2	**Log Run Date :**	6/6/1995	**Logging Engineer:**	Steve Kos
Start Depth, ft.:	46.5	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	53.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a
Log Run Number :	3	**Log Run Date :**	6/6/1995	**Logging Engineer:**	Steve Kos
Start Depth, ft.:	74.5	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	56.5	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a
Log Run Number :	4	**Log Run Date :**	6/6/1995	**Logging Engineer:**	Steve Kos
Start Depth, ft.:	53.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** Y
Finish Depth, ft. :	53.5	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a
Log Run Number :	5	**Log Run Date :**	6/6/1995	**Logging Engineer:**	Steve Kos
Start Depth, ft.:	56.5	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** Y
Finish Depth, ft. :	55.5	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Analysis Information

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Analyst : P.D. Henwood

Data Processing Reference : Data Analysis Manual Ver. 1 Analysis Date : 8/11/1995

Analysis Notes :

This borehole was logged in five runs. The fourth and fifth log runs were conducted with a tungsten shield because of a high count-rate zone. The shielded data were collected from 53 to 53.5 ft and from 55 to 56.5 ft. The shield did not attenuate the gamma rays sufficiently to prevent detector saturation. Because the data were not significantly improved, the shielded data were not used in log plots or analysis of the borehole data.

The pre- and post-survey field verification spectra showed consistent activities, indicating the logging system operated properly during data collection. Energy calibrations differed because of gain drift in the instrumentation. Gain drifts during data collection necessitated multiple energy versus channel number recalibrations during processing of the data to maintain proper peak identification.

The casing thickness was 5/16 (0.3125) inches. The correction factors for 0.33-in.-thick steel casing were used during analysis, which results in an almost negligible over-estimation of the radionuclide concentrations. No other corrections, such as for fluid, were made to the log data.

Data for depths 43 to 52 ft from log run 1 were lost due to computer problems in the logging system. Data were collected during log run 2 from 46.5 to 53 ft. Therefore, data from 43 to 46.5 ft are not available. Based on historical gross gamma logs, no elevated gamma readings occurred at this interval. Detector saturation prevented the system from recording spectra from 53.5 to 55.5 ft in depth. Spectra from just above and below the zone of detector saturation indicated elevated counts in the low-energy continuum. The elevated continuum could be caused by bremsstrahlung radiation, which is the result of a high-energy beta emitter such as Sr-90. Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank SX-108.

Log Plot Notes:

Three log plots are provided. The Cs-137 concentrations are provided in a separate log plot to document the relative concentrations and shape of the distribution. A plot of naturally occurring radionuclides (K-40, U-238, and Th-232) is also provided, which can be used for lithology interpretations. A combination plot includes logs of Cs-137, natural gamma, and total gamma derived from the spectral data, and the latest available data from the WHC Tank Farms gross gamma logging. The energy peaks from which the radionuclide concentrations were derived are shown in the headings for the Cs-137 and natural gamma plots.

To emphasize the maximum peak intensities, log scales were selected on the combination plot for the Cs-137 and Tank Farms gross gamma data. The natural gamma logs and total gamma log are plotted on a linear scale to emphasize the subtle lithology changes.

The statistical uncertainty in a measurement is represented by uncertainty bars on the log plots where appropriate. This uncertainty is reported at the 95-percent confidence interval. The minimum detectable activity (MDA) is represented as an open circle on the plots. The MDA of a radionuclide represents the lowest concentraton at which positive identification of a gamma-ray peak is statistically defensible. If the reported concentration is slightly above the MDA, the 95-percent confidence interval may extend below the MDA value, and detection is not assured with 95-percent certainty.

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The Tank Farms gross gamma plot is the latest available from WHC.